ACTION ITEMS

Item	Meeting	Action	Action By	Notes	Open Date	Due Date	Close Date	Status	Comments
1	MOWG	AP ID Designations	M. Maldanado & D. Hancock	Need AP ID designations for GLAS & SC H/K data that are sortable by the ground system in a manner acceptable by the Science Team. Impacts complexity of data sorting by the ground system. Goal is to break out data in separate APIDs when possible. Consider type of data, flexibility and density.	July 28, 1998	March 1, 1999	December 11, 1998	Closed	Replaced by RFA # 4A.
2	MOWG	Frozen Orbit Maintenance Tolerance and Coverage	B. Schutz		July 28, 1998	December 1, 1998	December 1, 1998	Closed	Preliminary simulations suggest that the maneuvered orbit to automatically approximate the frozen orbit. More detailed simulations are underway. If they do not verify the preliminary result, any additional maneuvers that may be required will be very small and have no significant impact on the delta-V budget. Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
3	MOWG	Inclination Corrections	B. Atkinson & O. Cuevas		July 28, 1998	December 1, 1998	November 30, 1998	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
4	MOWG	Total Delta V predictions exceed BASD's allocation	O. Cuevas	Delta V budgets do not agree between FDD and BASD.	July 28, 1998	December 1, 1998	November 30, 1998	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
5	MOWG	Clock Correlation	B. Pieper	Is clock correlation required? What happens if GPS fails with regard to timing?	July 28, 1998	December 1, 1998	December 11, 1998	Closed	Replaced by RFA # 75.
6	MOWG	FDD Role and Orbit Insertion Responsibilities	B. Anselm	FDD's role in orbit insertion. Who does calculations and who provides uploads, etc.? Project preference is to have Flight Dynamics provide this function.	July 28, 1998	December 1, 1998	January 29, 1999	Closed	Will be addressed in MORD being generated by Mark Kowaleski (due for release in March).
7	MOWG	Frequency of Ocean Sweeps	B. Schutz	How often expected?	July 28, 1998	September 30, 1999	September 29, 1999	Closed	Per Bob Schutz's presentation, twice/day cal period, and once/week during normal ops.

8	MOWG	Fixed Frame Target	B. Schutz	How often expected?	July 28, 1998	June 30, 1999	August 6, 1999	Closed	Ability to target fixed frame is included in baseline spacecraft pointing plus the new programmed track requirement. Frequency of use is an operational issue to be resolved real-time as a function of available command overhead on day-to-day basis.
9	MOWG	30 degree rolls over poles	E. Ketchum	Will this be practical from a science/link margin perspective to point at the poles?	July 28, 1998	December 1, 1998	October 2, 1998	Closed	In regards to figuring out the link margin from a 35-degree off-point, and determining if it was good enough to worry about off-pointing to the poles at all, the answer is yes.
10	MOWG	Observatory Coordinate Systems	B. Anselm	Need agreement on spacecraft, GLAS, and overall Observatory coordinate system. Impacts interpretation by FOT. FOT recommends using SC coordinate system.	July 28, 1998	December 1, 1998	September 30, 1998	Closed	The coordinate system for the ICESat Observatory is the coordinate system Ball defined for the spacecraft. This is because all the attitude control and inertial analysis will be done in that system, even regarding the sensors on the GLAS platform. The output from those sensors (IRU, IST) will have to be converted to the spacecraft coordinates for spacecraft use. All ground flight dynamics will be done in the spacecraft coordinate system.
11	MOWG	Solar Array Enable & Disable	BASD & B. Atkinson	Provide rules for enable and disable solar array tracking.	July 28, 1998	December 1, 1998	December 11, 1998	Closed	Addressed in MDR Presentation.
12	MOWG	CG determination	B. Schutz	Need CG requirements from Science Team for each axis.	July 28, 1998	June 30, 1999	August 6, 1999	Closed	The CG knowledge requirements are as originally stated: +/- 5 mm for each axis.
13	MOWG	Magnetic Field Model Update	B. Atkinson	How often and how much data involved? Who provides the model updates for the attitude control system?	July 28, 1998	June 1, 1999	April 16, 1999	Closed	No magnetic model updates are required for ICESat. Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).

14	MOWG	Bus Star Catalog Updates	B. Atkinson	Who provides, how much data, how often?	July 28, 1998	April 16, 1999	April 16, 1999	Closed	The star catalog will be updated two stars per update, twice per year. Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
15	MOWG	SC Time message on 1553 Bus	B. Atkinson	Accuracy of time code and how transferred - as a packet?	July 28, 1998	April 30, 1999	April 16, 1999	Closed	Replaced by Action Item #75.
16	MOWG	Bus Control Message Increment	K. Fox	Verify what errors the 1553 bus will detect and log. Are they telemetered?	July 28, 1998	December 1, 1998	September 18, 1998	Closed	The Bus Controller will detect the following errors by reading the Pending Interrupt Register: DMA Failure, Wrap Failure, Bit Failure, Message Error, Illegal Cmd, Illegal Opcode, Retry Failure. The most recently read value of the pending interrupt register is telemetered in the normal telemetry frame while the 1553 Error log contains the last 100 detected errors and is only available by downloading the table.
17	MOWG	GPS Receiver Commanding Requirements	M. Tasevoli	T&C handbook required by BASD to get command & telemetry formats defined.	July 28, 1998	December 1, 1998	September 1, 1998	Closed	
18	MOWG	RF Link Margin Calculations Revisit	B. Anselm	Conservative estimates and estimate rationale needs to be discussed and agreed to.	July 28, 1998	December 1, 1998	December 11, 1998	Closed	Addressed in RF ICD (CDRL 5A).
19	MOWG	Wallops Link Budgets	R. Cassell	Need WFF link budgets done to ensure coverage at WFF.	July 28, 1998	December 1, 1998	December 15, 1998	Closed	Action is considered closed now that the G/S ICD-RF (CDRL 5) is signed. The ICD contains both a line acknowledging the use of the WFF ground station as well as a graph of link closure to both the 11.3 meter dish and the 8 meter dish.
20	MOWG	Definition of SC and GLAS data required by SCF	B. Schutz	Definition of all data required to be delivered to the SCF and the latency requirements, including the expedited or rate-buffered data requirements. Latency is key issue here, along with any required flags to mark data for expedited or rate-buffered delivery.	July 28, 1998	June 1, 1999	June 2, 1999	Closed	Issue will be re-assessed when Data ICD is reviewed.

21	MOWG	Science Data Flow During SC Maneuvers	B. Schutz	What happens to science data during maneuvers? Is it flagged and ignored or is it processed and eliminated by the ground.	July 28, 1998	December 1, 1998	December 1, 1998	Closed	No special requirements on board. The primary concern is with delta-V maneuvers since the POD will be degraded during this period. Data acquired during delta-V maneuvers will be identified and flagged in the post-processing on the ground, though the flagging may be done with orbit quality flags.
22	MOWG	GLAS Telemetry Points required for SC Safe Modes	E. Ketchum	Definition of GLAS telemetry points required to be monitored by SC and used by SC to enter safe modes.	July 28, 1998	December 1, 1998	November 4, 1998	Closed	Approximately 6 thermistors will be provided to GLAS. GLAS will choose where they go and condition the data (TBR) so that Ball can act on them.
23	MOWG	DSU 256KByte Size	B. Atkinson	BASD proposes upsizing the DSU to 256KB.	July 28, 1998	December 1, 1998	December 11, 1998	Closed	Addressed in MDR Presentation.
24	MOWG	S-band contacts during each orbit	A. Kelly	Impact to ground system if S-band contacts are required during each orbit for SC health & safety. Also, impacts to SC if one S-band contact is scheduled every orbit).	July 28, 1998	December 1, 1998	December 11, 1998	Closed	Addressed in MDR Presentation.
25	MOWG	Transmitter On-Off Operation after contacts	A. Kelly	BASD does not recommend having transmitters on while SC goes over horizon. Major thermal & power issue if stored command does not shut off transmitter.	July 28, 1998	December 1, 1998	December 11, 1998	Closed	Addressed in MDR Presentation.
26	MOWG	SC Time Code Format Recommendation	T. Rykowski	SC time code format recommendation. This is continuation of same topic started at system interface working group in May 98.	July 28, 1998	December 1, 1998	September 24, 1998	Closed	Closure Memo on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
27	MOWG	Transmitter over temp shut off and override by ground	B. Atkinson	Level of control over auto shut off for thermal overload of transmitter.	July 28, 1998	April 16, 1999	April 16, 1999	Closed	The transmitter over-temperature shutdown can be overridden from the ground.
28	MOWG	Y2K concern	All	Verify that all ICESat systems are Y2K compliant.	July 28, 1998	December 1, 1998	December 11, 1998	Closed	Addressed by Contract Modification #13.
29	MOWG	Training Level Recommendations	J. Pawloski	Training Level recommendations for FOT for OJT by BASD during I&T.	July 28, 1998	December 1, 1998	September 25, 1998	Closed	Closure Memo on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).

30	MOWG	SC Star Tracker requirements for backup for POD/PAD Options?	B. Schutz	Use of SC startracker as backup for POD/PAD.	July 28, 1998	December 1, 1998	December 1, 1998	Closed	SC star tracker (ST) should be available to backup instrument star tracker. Data from SC ST and Instrument ST required during initial verification phase to perform cross-calibrations. During main mission, occasional data required for continued verification of cross-calibrations. Continuous data from SC ST required if problems exist with Instrument ST. Orientation of the SC ST will limit the ability of the ST to contribute to science requirements in the backup mode, but this is acceptable.
31	MOWG	SC Bus Simulator for use by FOT impacts	R. Cassell & A. Kelly	What EOSDIS would like, what BASD plans on delivering, and what is really adequate.	July 28, 1998	December 1, 1998	December 15, 1998	Closed	
32	MOWG	Simulation and Rehearsal recommendations by EOSDIS	M. Kowaleski	Recommendations for simulations and rehearsals for I&T and GSCT's.	July 28, 1998	December 1, 1998	January 29, 1999	Closed	Will be addressed in MORD due for release in March.
33	MOWG	On-orbit activation and check-out timeline	B. Atkinson	Provide a timeline of actual activation and check-out requirements, independent of contractual requirements. Includes timelines, when, how, etc.	July 28, 1998	December 1, 1998	December 11, 1998	Closed	Replaced by RFA # 1A.
34	MOWG	On-orbit Check-out and transition to Operations Philosophy	A. Kelly & R. Cassell	Difference in philosophy on "who is driving" during SC checkout and transition to operations.	July 28, 1998	December 1, 1998	September 21, 1998	Closed	Zubin Emsley agreed that the FOT will be executing the operations at the Control Center, with BASD providing the L&EO direction.
35	Sep98TIM AI#1	Presentation of detailed state diagram on paths	B. Atkinson	Present detailed state diagram on paths to enter safe-hold modes.	September 21, 1998	December 11, 1998	December 11, 1998	Closed	Replaced by RFA #2C.
36	Sep98TIM AI#2	Requirement for SCC Commanded Detector Shut-Down	E. Ketchum	Identify if there is a requirement for SCC commanded detector shut-down when the sun might be within +/-30E of the GLAS Telescope boresight.	September 21, 1998	September 25, 1998	October 2, 1998	Closed	The detectors must be off if the Sun exclusion constraint is violated.
37	Sep98TIM AI#3	Frequency of UV1 Based on Qbird power cycling	B. Atkinson	Estimate frequency of UV1 based on Qbird power cycling.	September 21, 1998	April 16, 1999	April 16, 1999	Closed	Qbird launch delayed too late to be relevant.

38	Sep98TIM AI#4	Data architecture for BASD consideration	B. Anselm	Define proposed data architecture for BASD consideration (IRU, IST, LRS, SDF) in concert with GLAS, Science & EOSDIS input.	September 21, 1998	April 30, 1999	April 16, 1999	Closed	Data architecture for the IRU, IST, LRS in the SDF is defined and a CCR is underway.
39	Sep98TIM AI#5	Accommodation of LRS in MEU	E. Ketchum	Estimate impact to accommodate LRS in MEU.	September 21, 1998	September 25, 1998	October 2, 1998	Closed	It is Eleanor's impression that LRS data will be handled through the bus 1553. As a ROM estimate, since no known vendors provide the star tracker or LER data at the frequencies which are needed over a 422, the following should be considered: the cost of adding the 1553 to 422 'bridge' hardware is on the order of $800K for either the tracker/LRS vendor(s) or for GLAS to provide; it is impractical for GLAS to implement it's own 1553 (so that the MEU is a BC) for two reasons--it is late in the design phase and more profoundly, it would be difficult if not impossible to implement (the MEU would be a BC on one 1553 and an RT on another); an RT-RT transfer (so that the LRS data could be put in MEU to be packaged up into the 422 data stream) is apparently difficult for the 1553 to do within it's traffic bandwidth.
40	Sep98TIM AI#6	Y-axis rate for GLAS to assess detector damage	M. Scott	Identify lowest likely Y-axis rate for GLAS to assess detector damage.	September 21, 1998	October 2, 1998	October 5, 1998	Closed	Minimum rate of .94 degrees per second.
41	Sep98TIM AI#7	Approach to synchronize GLAS and spacecraft clocks	M. Tasevoli	Define approach to synchronize GLAS and spacecraft clocks.	September 21, 1998	April 30, 1999	April 16, 1999	Closed	Replaced by Action Item #75.

42	Sep98TIM AI#8	Need for second spacecraft simulator	E. Ketchum	Identify if a second spacecraft simulator is needed.	September 21, 1998	October 2, 1998	October 2, 1998	Closed	There is no need from a GLAS perspective for a second simulator. We can return it for it's phase 2 'upgrades' as long as the upgrades take approximately one month or less.
43	Sep98TIM AI#9	GLAS grounding concept	E. Ketchum	Provide preliminary GLAS grounding concept.	September 21, 1998	September 30, 1998	October 13, 1998	Closed	Closure Memo on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
44	Sep98TIM AI#10	Bench test layout and dimension estimates	T. Feild	Provide bench test layout and dimension estimates (to establish simulator cabling type and lengths).	September 21, 1998	October 23, 1998	December 11, 1998	Closed	All simulator cables must be at least 65 feet in length. Additional details on the cables (wire type, etc.) will be supplied with the response to Action #45.
45	Sep98TIM AI#11	MEU and power feed interface pin-outs for simulator	T. Feild	Define MEU and power feed interface pin-outs for simulator.	September 21, 1998	March 17, 1999	March 10, 1999	Closed	According to Mike Plants and Roger Stone, BASD has the necessary information.
46	Sep98TIM AI#12	Current GLAS telemetry list	E. Ketchum	GLAS lead software engineer will communicate with Ball 1553 designer to provide what is required for simulator testing.	September 21, 1998	February 15, 1999	January 15, 1999	Closed	Ball 1553 designer is satisfied.
47	Sep98TIM AI#13	Connector types and delivery	E. Ketchum	Identify connector types and when they will be delivered.	September 21, 1998	November 10, 1998	January 15, 1999	Closed	As of October 26, 1998, all of the connectors were done, except the 1553. Technical issues involving the 1553 have since been worked between Ball and GSFC.
48	Sep98TIM AI#14	IRU, IST, and LRS test (data) modes	E. Ketchum	Identify if IRU, IST, and LRS have test (data) modes to support ACS performance testing prior to GLAS delivery.	September 21, 1998	April 30, 1999	April 30, 1999	Closed	Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
49	Sep98TIM AI#15	IRU, IST, and LRS on loan to BASD for ACS checkout	B. Anselm	Determine if IRU, IST, LRS can be loaned to BASD April/May to June/July '99 for ACS checkout.	September 21, 1998	June 30, 1999	June 30, 1999	Closed	IRU IWG scheduled for 7/16/1999; IST PO in progress.
50	Sep98TIM AI#16	Confirmation that thermal analysis for CCR-002 is based on the latest solar array dimensions	E. Ketchum	Confirm the thermal analysis for CCR-002 (Two Radiators) is based on the latest recent solar array dimensions from Ball.	September 21, 1998	September 22, 1998	September 18, 1998	Closed	Out-year mission operations include and recognize the critical need for an IOT. Sustaining engineering will be addressed in out-year planning, as required.
51	Sep98TIM AI#17	Configuration Management Plan to BASD	B. Anselm	Provide BASD the Project Configuration Management Plan.	September 21, 1998	September 22, 1998	September 22, 1998	Closed	

52	Sep98TIM AI#18	Emergency mode 50 Watt vs. Acquire Sun 150 Watt	E. Ketchum	Confirm Emergency Mode 50 W vs Acquire 150 W.	September 21, 1998	November 15, 1998	November 4, 1998	Closed	The emergency draw should be less than 100 watts, although more work and a complete thermal design are required to determine the exact requirement. The power allocation for emergency thermal needs was allocated to GLAS (per the Modes and States TIM).
53	Sep98TIM AI#19	Identify mounting constraints of the radiator attach points	T. Feild	Identify the mounting constraints of the radiator attach points and determine if heaters could be attached inboard for Observatory T/V.	September 21, 1998	November 30, 1998	November 17, 1998	Closed	Tom Feild has stated that he is strongly against mounting the thermal vacuum chiller plates directly to the flight radiators. His concerns were expressed in a memo dated November 17, 1998 (which is on file in the CMO). (Refer to CMO Document Number: ICES-401-MISC-002).
54	Sep98TIM AI#20	VCL using patch or choke ring GPS antennas	M. Tasevoli	Determine if VCL is using patch or choke ring GPS antennas.	September 21, 1998	October 2, 1998	October 1, 1998	Closed	Mission Requirements dictated that a patch antenna be used.
55	Sep98TIM AI#21	Review and distribute the EOSDIS configuration management procedures (for RF and data ICDs)	B. Anselm	Review and distribute the EOSDIS configuration management procedures (for RF and Data ICDs).	September 21, 1998	October 9, 1998	October 22, 1998	Closed	Closeout documentation provided to CMO and is available upon request. (Refer to CMO Document Number: ICES-401-MISC-002).
56	Sep98TIM AI#22	Acceptance criteria for milestone 14 to the DIS	B. Anselm	Provide the acceptance criteria for Milestone 14 to the DIS.	September 21, 1998	September 22, 1998	September 25, 1998	Closed	
57	Sep98TIM AI#23	Definition of 'beyond 30-day' operations	B. Anselm	Define 'beyond 30-day' operations and which require BASD support.	September 21, 1998	December 11, 1998	October 23, 1998	Closed	The types of activities that might require Ball support from time to time during the ICESat mission, beyond the L+30 acceptance date are: On-orbit star tracker calibration against pre-launch alignment data, FDD support for maneuvers and location determination, yaw transition (airplane to sailboat mode), return to calibration orbit, maximum eclipse season, delta Vs (orbit maintenance), and anomalies.

58	Sep98TIM AI#24	Identification of way to correlate the GLAS GPS time to the 48-bit microsecond spacecraft counter kept on the bus	B. Atkinson	Identify a way to correlate the GLAS GPS time to the 48-bit microsecond Spacecraft counter kept on the bus.	September 21, 1998	December 11, 1998	December 11, 1998	Closed	Replaced by Action Item # 75.
59	Sep98TIM AI#25	Definition of 'event' or 'milestone' versus 'launch plus 30 days' in which in-orbit checkout of spacecraft will be considered complete	M. Kowaleski	Define 'Event' or 'Milestone' versus 'Launch plus 30 Days' in which in-orbit checkout of spacecraft will considered as complete and operational responsibility is transferred from BASD to the ESDIS FOT. Define at what point during the instrument checkout will the instrument team be comfortable with BASD transition to the FOT.	September 21, 1998	December 11, 1998	January 29, 1999	Closed	Will be addressed in MORD due for release in March.
60	Sep98TIM AI#26A	I&T flow with identifiable hooks and GSE	B. Atkinson	Provide top-level I&T flow with identifiable hooks and GSE.	September 21, 1998	June 1, 1999	April 13, 1999	Closed	Per Ball discussions.
61	Sep98TIM AI#26B	Antenna pattern for GPS antenna with choke ring	M. Tasevoli	Provide antenna pattern for GPS antenna with choke ring.	September 21, 1998	October 2, 1998	October 14, 1998	Closed	Closeout documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
62	Sep98TIM AI#27	Interim database and C&T Handbook	P. Lyman	Interim database to go with the C&T handbook.	September 21, 1998	July 1, 1999	November 22, 1999	Closed	Closed by User's Manual delivered with ITOC.
63	Sep98TIM AI#28	Q/S option uplink format as opposed to a highly modified 32-bit format	A. Kelly	Is use of a Q/S option uplink format as opposed to a highly modified 32-bit format (command sequence) ok?	September 21, 1998	October 1, 1998	October 1, 1998	Closed	David Campbell (ESDIS Flight Segment Development) has evaluated the format and finds it acceptable for inclusion in the control center system that will be provided for ICESat.
64	Sep98TIM AI#29	Map Lozinkski's document list into the CDRL	R. Cassell	Map Lozinski's document list into the CDRL to confirm that they are covered by planned documentation.	September 21, 1998	October 2, 1998	October 2, 1998	Closed	Closeout documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).

65	Sep98TIM	Flight Software Requirements Document	A. Kelly	What is being used?	September 21, 1998	October 2, 1998	October 2, 1998	Closed	The baseline flight software requirements document is the BCP2000 Flight Software Requirements Specification. ICESat will have an additional Flight Software Requirements document which contains the ICESat specific requirements and any differences or deviations from the BCP2000 Flight Software Requirements document. This document is a deliverable for the MDR and is currently in progress. It was agreed that it might be better to have a copy of Kathy Fox's recent Flight Software presentation and a presentation of that material by Kathy Fox at the next TIM or MDR.
66	MDR RFA 1A	L&EO Analysis Maturity (MDR #13, 7, 15, 58)	B. Atkinson	Provide more detailed launch ascent, early orbit, and subsystem checkout analysis. Base this on the ATHENA II and the Kodiak site, and incorporate Science launch window considerations. Include subsystem/component rules and constraints to determine event ordering and prerequisite actions, battery margin evaluation, subsystem checkout process, ground contact coverage, potential use of TDRSS, etc. (Herring) Also, there should be more details regarding S/C subsystems checkout and preferred ground station contact times. (Kowaleski) Work the details of the launch timeline for power, ACS, communication systems, and the nominal and contingency cases. (Castell) (Spidaliere)	December 11, 1998	June 1, 1999	March 22, 1999	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).

67	MDR RFA 2A	Lack of Concept on S/C Operations (MDR # 25)	M. Kowaleski	Development of operations concept is required with participation of S/C developer, ground system personnel, and instrument team. Operations concept should be verified against S/C capabilities to assure mission operations is of acceptable risk in terms of S/C and instrument health and safety and ability to achieve science goals. Given the strong link to QuikSCAT and GFO design, consideration should be given to starting with heritage operations concepts with indication of likely impacted areas to be jointly worked as implementation proceeds. (Herring)	December 11, 1998	March 31, 1999	March 16, 1999	Closed	ICESat Operations Concept to be developed and included in the MORD.
68	MDR RFA 2B	Flight Direction (MDR #11)	M. Kowaleski	Presentation indicated that ICESat will "fly" in 4 different directions based on solar beta angle. Action should be taken to assure that adequate input (e.g., mission rules, constraints, contingencies), tools, and downlink telemetry are provided to the operations teams (flight and instrument) to support on-orbit planning and operations. Additionally, discussion and follow-up with data analysis team is required to identify any impacts/implications for science processing and to assure adequate S/C data are provided and available to support data processing and precision orbit determination on-orbit. (Herring)	December 11, 1998	April 15, 1999	December 4, 1998	Closed	Refer to Spacecraft Operations Description Manual.

69	MDR RFA 2C	Watchdog Hierarchy (MDR #14, 89)	B. Anselm	Generate a Watchdog Hierarchy diagram which addresses system response to anomalous events. This should depict levels of severity and the actions taken at each level. (Voyton) Describe onboard telemetry monitoring and fault detection, isolation, and correction capability and their use in mission operations (Herring)	December 11, 1998	June 1, 1999	March 22, 1999	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
70	MDR RFA 2D	Stored Command Capability (MDR #28, 29, 45)	E. Chang	Evaluate the capability of 1024 commands versus what is really needed to command the spacecraft, including all the commands associated with science requirements. Define all the commands required for S/C, instrument, etc. and determine if one upload per day will be sufficient. (Kowaleski) Ball/GLAS needs to define exactly how many commands are required to satisfy GLAS pointing requirements, nominal C&DH commanding requirements, and other required command loads. (Pawloski) Presenter stated the number of accepted and rejected commands will be provided in telemetry. Will there be an indication of which specific commands have been rejected? Also, how does the spacecraft verify that the GLAS commands have been received correctly by GLAS? (Kowaleski) [GLAS issues also in 3C] Confirm requirement for table load commanding/loading and dumping and provide implementation approach. (Pawloski)	December 11, 1998	July 15, 1999	September 29, 1999	Closed	1024 is sufficient to operate the spacecraft for two days. Rough estimate shows that 350 commands are for reference track pointing, roughly 50 reserved for unexpected events, the rest is enough to be split between GLAS and spacecraft bus. This will be revisited after spacecraft thermal vacuum to confirm these estimates. Spacecraft will not verify which GLAS commands have been received by GLAS.

71	MDR RFA 2H	Emergency Mode Controller (MDR # 66A)	M. Kowaleski	Flight ops team needs to be aware that emergency mode controller must be re-enabled if it is necessary to execute it again. (Zimbelman)	December 11, 1998	August 31, 1999	December 4, 1998	Closed	Refer to Spacecraft Operations Description Manual.
72	MDR RFA 3A	Ground System Data ICD Maturity (MDR #12)	M. Kowaleski	It is evident that excellent communication and coordination occurs on a continual basis across the S/C, instrument, and ground system teams; however, the level of maturity of the GS data ICD and the schedule for closing out open areas are troubling. If not already done, a plan to close out open areas should be developed and tracked regularly. This plan should be developed based on level of risk (i.e., potential for significant change and impact of change) across ICESat Program of interface unknowns. (Herring)	December 11, 1998	May 30, 1999	March 22, 1999	Closed	Homepage presentation shows how actions and risks are tracked.
73	MDR RFA 3B	Providing Spacecraft Orientation, Target, and ACS "Mode" Information to Science Processing Software (MDR #17)	E. Chang	Once it is defined (in "ICESat to ground ICD"?), the Position and Attitude Packet should include the current ACS mode, current spacecraft orientation and whatever additional information is needed by the science processing team. The content of this packet should be agreed to by the science processing software team as part of the sign-off of the ICESat to ground ICD in order to ensure that the packet contains all necessary data. (Love)	December 11, 1998	July 15, 1999	September 29, 1999	Closed	Provide spacecraft orientation, target, ACS modes info to science processing software; PRAP contains the information, will be described in the Data Spacecraft to EGS ICD.

74	MDR RFA 3C	GLAS to Ground System Interface (MDR #18)	E. Chang/ E. Ketchum	Develop a mechanism for documenting GLAS specific interfaces with the Ground System. These interfaces (information on GLAS commands, GLAS load and dump formats, etc.) should either be included in Ball's ICESat to Ground System ICD or documented in some new document. (Love) [GLAS commanding also in #2D]	December 11, 1998	March 1, 2000	August 3, 1999	Closed	Ball/LASP will develop MOC/ISF ICD.
75	MDR RFA 3D	C&DH Clock Correlation (MDR # 31)	B. Anselm	Ball/GLAS need to define how engineering telemetry will be timecoded and how accurate this time is to be kept. This provides for eventual accuracy of orbit maneuvers, off nadir pointing accuracy and other GLAS command accuracy. Also, there needs to be a plan in place to correlate this time to the GPS time for correlation to some absolute time (since the VTCU is only a relative counter that gets reset upon CTC reset). Additionally, there may need to be a back-up correlation method available (through RDD or USCCS) when the GPS receivers are in some unknown state (either off, safe modes, or GPS malfunction). How are GLAS and H/K data time correlated? (Pawloski)	December 11, 1998	July 23, 1999	September 29, 1999	Closed	This Action Item replaces Action Items # 15, # 41, and # 58. To be resolved in a timing study to be completed 12/1999.
76	MDR RFA 4A	RT (1553) Address Assignment (MDR # 24)	B. Anselm	Assign RT addresses to system with multi-bit differences to maximize distance. (Voyton)	December 11, 1998	June 1, 1999	March 22, 1999	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).

77	MDR RFA 4B	1553 Bus Utilization Timeline (MDR #46, 50, 74)	B. Atkinson	Generate a more detailed 1553 bus utilization timeline to assure ample peak bandwidth. Assess impact of interrupts (especially DTU) on overall accuracy of the timeline, data collection, etc. (Voyton) In the current flight software timeline, the sampling of the 10 Hz IRU data over the 1553 bus was proposed to be done as part of the ADCS processing. However, the heritage design (QuikScat) the IRU data was sampled at a much faster rate using a different interface RS-422. Given that there is no knowledge of the latency of the interrupts within the ICESat flight software, the actual variation in the sampling of the 10 Hz gyro data is unknown. As a result, the effects of this variation on the ICESat ACS performance and the attitude determination for science data processing are unknown. Ball needs to either determine what the variability in the IRU data sampling is and what the potential impacts are, or implement a more deterministic means of sampling the IRU data (moving the 1553 bus schedule to the 1553 chip set should accomplish this). (Love)	December 11, 1998	June 1, 1999	March 22, 1999	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
78	MDR RFA 4C	EEPROM Write Protection (MDR # 52)	S. Scott	It is preferred to have an area of EEPROM that is HW write-protected. This protected area need only initialize HW and allow for flight code uploads. (Voyton)	December 11, 1998	June 1, 1999	March 22, 1999	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).

79	MDR RFA 5A	Both Computers On/Thruster Based Safehold (MDR # 61)	B. Anselm	Recommend that the redundant SCC be flown as a warm back-up and that if the primary SCC fails that the redundant SCC take over to avoid immediately triggering thruster firing. *I'm OK* schemes have been used before between boxes on 1553s. (Similar logic for the voltage sense may be appropriate). If the proposed approach is not appropriate, some other approach that does not rely on thrusters after one failure should be developed. (Spidaliere)	December 11, 1998	March 22, 1999	March 22, 1999	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
80	MDR RFA 5B	Thruster Timeout Circuit, Nominal Ops (MDR #63)	B. Anselm	A hardware timer should be considered that prevents a thruster stuck on case. This might be designed such that if it does not receive a "Fire" command in "N" msec then the thruster is turned off or the latch valve is closed. (Spidaliere)	December 11, 1998	March 22, 1999	March 22, 1999	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
81	MDR RFA 5C	Emergency Mode 3 (MDR #79)	B. Anselm	Have Ball model Emergency Mode 3 to use CSS and thrusters and SEP to drive -Z axis to Earth/Sun line avoiding sunlight into GLAS, and maintaining control. (Lozinski)	December 11, 1998	March 22, 1999	March 22, 1999	Closed	Not an effective emergency mode for ICESat. Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).

82	MDR RFA 6D	Software Controlling Safety (MDR #76)	B. Anselm	Software that is used to control critical safety functions such as GLAS sun avoidance software "needs" to be developed in accordance with and have a software safety analysis performed in accordance with NSS 1740.13 and NASA Guidebook 1740.13-96. (Garvin)	December 11, 1998	April 30, 2000	June 6, 2000	Closed	The fixed-price nature of the contract discourages extensive investigation and analysis, this having been done during the evaluation of the core RSDO proposals as well as the ICESat offers. There is no software used in the "Emergency Mode", and the threshold detection to get in that mode is done by highly redundant sun and voltage sensors. This, coupled with the analysis already provided, means further evaluation of the safe-hold software would not be productive nor warranted. Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
83	MDR RFA 7A	Required Allocation/Budget Across Subsystems (MDR #10)	B. Atkinson	Presentation of requirements analysis and allocation did not include demonstration that system level (other than power and mass) requirements allocated across subsystems included budget allocation to specific subsystems with margin held at system level to meet system level requirements. Provide summary of system-level requirements allocation to subsystems/components along with demonstration that subsystems are able to meet allocations. (Herring)	December 11, 1998	June 1, 1999	March 22, 1999	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).

84	MDR RFA 8A	General Temperature Requirements (MDR # 36, 26)	D. Wood	Some temperature limits appear to conflict with normal GSFC requirements, specifically hydrazine limits and battery range. Show component performance margins exist with these more severe limits. (Grob) Consult with battery expert at GSFC on the temperature limits for nickel hydrogen battery. (Castell)	December 11, 1998	February 29, 2000	August 14, 2000	Closed	Ball will now use a Test Battery, and has arranged for a cooler to be used on Test and Flight Batteries. The thermal environment will be analyzed with respect to the GSFC Battery Handbook and the results documented in a report.
85	MDR RFA 8D	Sine Testing (MDR #42)	D. Wood	Consideration should be given to limiting sine testing of observatory to 65Hz rather than 100 Hz as currently planned. Other concerns: Sweep rate to cover resonant burn condition should be carefully considered--may have to be slowed down; Effect of not having propellant mass present for this test should be evaluated (cf RFA 69). Dynamic response of observatory could be significantly affected. (Ryan)	December 11, 1998	October 29, 1999	October 29, 1999	Closed	Closed by memo to KSC; Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
86	MDR RFA 8E	GLAS Instrument Static Load Factors (MDR #43)	D. Wood	Current limit static load factors for GLAS c.g. are higher in the Z axis (15.5 g's) than GLAS has used for design (12 g's). Recommend ultimate launch vehicle interface design solution or other design modifications bring GLAS Z-axis static load factor in at 12 g's or less. (Ryan)	December 11, 1998	October 29, 1999	May 21, 1999	Closed	CLA provided to Boeing. Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
87	MDR RFA 8F	Second Stage Dynamic Load (MDR #48)	D. Wood	Provide rationale for not considering the +6.2 g's dynamic load from the Athena II second stage ignition (see pg Struct-4) in subsequent analyses/test program. A maximum dynamic load of +5.0 g's was used. (Ryan)	December 11, 1998	February 29, 2000		Open	

88	MDR RFA 8G	Strength Qualification (MDR #44)	D. Wood	Define strength qualification plans for the observatory. Sine burst testing in each of 3 orthogonal axes is planned for the observatory. Which components, subsystems, interfaces are being qualified? What, if anything, is being qualified by analysis or by similarity? Will uniaxial tests achieve 1.25x maximum predicted loads for items being qualified? Have static load tests been considered? (Ryan)	December 11, 1998	March 23, 2000		Open	
89	MDR RFA 9A	GLAS Tracker Stimulation for Phasing Test (MDR # 54)	M. Tasevoli	Some kind of tracker stimulus is needed for end-to-end phasing at the observatory level. (Zimbelman)	December 11, 1998	June 30, 1999	September 29, 1999	Closed	IST phasing will be established at GLAS I&T and re-confirmed at Observatory I&T using built-in stimulator. According to Eleanor Ketchum (2/28/00), the tracker is not being used by the spacecraft ACS so that phasing in the onboard software is not an issue, further the data will only be used in post-processing where any gross misalignment will be obvious.
90	MDR RFA 9B	I&T/Environmental Testing (MDR #68)	D. Wood	The observatory vibration/acoustic tests should be conducted with all the systems/components powered on that will be on at launch. (Castell)	December 11, 1998	February 29, 2000	May 2, 2000	Closed	Powered-off testing was agreed to in the baseline fixed-price proposal. Transporting and reconfiguring the GSE at Denver is not included. There is no significant benefit from pre and post testing at Denver vs. the Ball facility.
91	MDR RFA 9C	Solar Array Hot Flash Testing (MDR # 66B)	D. Wood	Consider performing "hot flash" testing of solar array panels to inspect panels for cracked cells. Recommend tests both before and after environmental testing. (Ryan)	December 11, 1998	October 29, 1999	June 4, 1999	Closed	Hot Box tests will be run on the Qual Panel at Spectrolab. The recommendation for post-environmental testing was withdrawn.

92	MDR RFA 9F	I&T - T/V (MDR #72, 65)	D. Wood	Thermal balance should include HOT, COLD operational mode and COLD (NON-OP) for heater verification (may be done in cold qual plateau); Chart #30 says 124TCs (83=S/C, 41=GSE) none for GLAS?! Or do S/C and GLAS share 83? Different yaws should be simulated in thermal balance. How verify <0.10" TILT on GLAS CCHP's and account for transition to LN_2 (Shift in floor, fixture)? TB before thermal cycle plateau. (Grob) Recommend that the thermal balance test be run before the thermal vac test. (Spidaliere)	December 11, 1998	March 23, 2000	May 2, 2000	Closed	Thermal issues have been defined for GLAS and Observatory on-orbit conditions. Thermocouple allocation and sharing is being worked. Detailed actions have been assigned to each issue for further resolution (See Action Items 157, 158, 159).
93	MDR RFA 9G	Single Point Failures (MDR #84)	M. Tasevoli	I recommend that additional single point failure modes, such as: short on unfused bus failure of SA hinge be identified so that special attention can be paid to all such areas. For the harness, I recommend that special care be taken during inspections to make sure wire does not come near sharp edges and is wrapped in Teflon whenever cold-flow could cause a short. Similar procedures and additional inspections (as close to launch as possible) should be performed on all such critical areas. (Feild)	December 11, 1998	June 1, 1999	June 4, 1999	Closed	Detailed solar array panel design was presented at a Solar Array TIM.
94	MDR RFA 9H	Radiated Susceptibility (MDR # 86)	D. Wood	Radiated Susceptibility should be performed on the Observatory with GLAS powered ON so that positive margin can be shown on self-compatibility. (Feild)	December 11, 1998	March 23, 2000	May 2, 2000	Closed	GLAS is powered off at launch. On-orbit margin does not need to be determined explicitly, detailed subsystem EMC test data will provide enough data for analysis.

95	MDR RFA 10B	Reliability Analyses (MDR #21)	M. Tasevoli	The instrument and S/C reliability analyses should be compared to determine if failures could propagate across the interface. Have the reliability analysts meet and discuss failure modes etc. (Garvin)	December 11, 1998	April 30, 2000	May 1, 2000	Closed	Released as GLAS document # GLAS-924-ANYS-002.
96	MDR RFA 10D	Analysis Cases (MDR #33)	B. Anselm	All analysis cases, especially delta v maneuver must be looked at as an observatory level (integrated S/C and GLAS thermal models) as it places direct sun on radiators for significant amount of time. Also on stand and launch/ascent analysis must be performed to ensure components do not overheat, especially batteries. (Grob)	December 11, 1998	April 30, 2000	September 22, 2000	Closed	The thermal cases for seaparation, coast and initialization, normal and emergency operation have been examined and it has been determined that thermal over/understresses so not exist for the foreseen orbital conditions. There is sufficient power for worst-case survival heater loads, and cooling is adequate to assure no over temperatures occur.
97	MDR RFA 10E	Antenna Blockage (MDR #47)	M. Tasevoli	Perform a study to show the anticipated number of GPS satellites visible over the mission configurations given the antenna blockage. (Zimbelman)	December 11, 1998	June 30, 1999	September 24, 1999	Closed	GPS Antennas to be raised so field of view is clear from horizon-to-horizon.
98	MDR RFA 10H	Orbit Debris Analysis (MDR # 77)	M. Tasevoli	The Project needs to complete a mission orbit debris analysis including all requirements for debris generation due to mission ops, micrometeoroids, collision, explosions, etc. The re-entry analysis needs to include size predictions of re-entry hardware. All energy sources need to be depleted during dsof/orbit decay phase of mission prior to re-entry. (Garvin)	December 11, 1998	June 1, 1999	March 22, 1999	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).

99	MDR RFA 10J	Thermo-Optical Properties of Silver Teflon (MDR # 88)	R. Kolecki	Justify EOL Alpha (alpha= 0.16) shown in Thermal presentation, for 5 year EOL mission, using on-orbit data, etc. for the specified 5 mil AgTef tape. GSFC materials branch does not agree with this value. EOS-AM, -PM, and GLAS use alpha EOL of 0.25 due to UV exposure of adhesive layer due to micro-cracking of silver layer during application of 5 mil tape. (Grob)	December 11, 1998	April 30, 2000	May 23, 2000	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
100	MDR RFA 10K	Microswitches and Separation Break Wires, Redundancy (MDR # 64, 83)	M. Tasevoli	Consider use of multiple microswitches (3) and voting logic to sense SA deployment; Consider use of multiple breakwires (3) and fault tolerant circuitry to sense separation (and for launch, if sensed). (Spidaliere) The solar arrays will not index if the SA deployed microswitch fails. A thorough failure/risk analysis of the solar array deployment, the auto sequencer, and other critical items from launch to sun acquisition should be developed. (Feild)	December 11, 1998	June 1, 1999	April 16, 1999	Closed	Not a cost effective measure for ICESat.
101	MDR RFA 10M	Solar Array and Solar Array Deployment Mechanism (MDR # 41)	M. Tasevoli	Recommend further review for solar array structural design and solar array deployment mechanism. (Ryan)	December 11, 1998	June 15, 1999	June 4, 1999	Closed	The structural design and deployment mechanism details were presented at a Solar Array TIM.
102	MDR RFA 11B	ACS Simulation Fidelity (MDR #51)	M. Tasevoli	What are the assumptions in your ACS simulations e.g., one cycle delay, sensor/actuator noise and quantizations, etc.? (Zimbelman)	December 11, 1998	June 1, 1999	April 22, 1999	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).

103	MDR RFA 11C	C&DH Command Table Loading/Dumping (MDR # 30)	M. Kowaleski	Confirm requirement for table load commanding/loading and dumping and provide implementation approach. (Pawloski)	December 11, 1998	June 1, 1999	December 4, 1998	Closed	Refer to Spacecraft Operations Description Manual.
104	MDR RFA 11D	Thermal Analysis Component Heritage (MDR # 37)	B. Atkinson	Specific components not shown in thermal analysis section that were/are heritage: 1) solar array drives and 2) thrusters. Provide matrix of heritage components to include elec. Boxes, mechanisms, sensors, etc. vs. modified vs. new. Provide analysis details. (Grob)	December 11, 1998	June 1, 1999	April 9, 1999	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
105	MDR RFA 12B	Thermal Analysis Inputs/Configuration (MDR #38)	B. Anselm	BASD thermal analysis reports should be provided to GSFC to ensure the analysis assumptions and results are fully understood. Also, details of TCS H/W when defined, to be provided. (Grob)	December 11, 1998	June 1, 1999	March 22, 1999	Closed	Closure documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).

106		Solar Cell Radiation Tolerance	B. Atkinson	Provide the radiation environment used by Spectrolab to design the cells.	June 4, 1999	June 30, 1999	October 5, 1999	Closed	BASD provided a copy of the Spectrolab radiation environment to Dr. Ed Gaddy for review. Dr. Gaddy computed the radiation environment independently and came up with a radiation fluence, which is higher than Spectrolab's estimate. Spectrolab did not include a contribution from solar flare particles which Dr. Gaddy did. Gaddy's calculation provides a 99% confidence that the number of particles will not exceed what has been predicted. BASD will re-examine the energy balance calculations and report the power subsystem capability in a SER around November 1999.
107		Dark IV Curve	P. Lyman	Provide the Dark IV Curve for the solar array and discuss the implications for string damage due to shadowing.	June 4, 1999	May 30, 2000	August 1, 2000	Closed	Curves due with delivery of hardware. Curves provided and discussion held to resolve the qualification information.
108		Array Qual Panel	M. Tasevoli	Review the details of the array qual panel and determine if it is similar enough to the flight panels to qualify by similarity.	June 4, 1999	April 30, 2000	February 25, 2000	Closed	Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002, Ball SER EPS085).
109		SADA Life Limits	P. Lyman	Provide an analysis of the SADA life limits.	June 4, 1999	August 30, 1999	February 23, 2000	Closed	Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002, Ball SER EPS078).
110		SADA Temperature Limits	B. Atkinson	Provide an analysis of the SADA temperature limits.	June 4, 1999	August 30, 1999	October 7, 1999	Closed	Closed with Systems Engineering Report; Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
111		SADA Dampers	B. Atkinson	Identify the process controls which will avoid bubbles in the fluid dampers.	June 4, 1999	August 30, 1999	October 5, 1999	Closed	Each damper will undergo mechanical burn-in and TV testing over expected operating range at the DEB facility to verify consistent performance and that there are no bubbles in the damper fluid.

112	Sep99TIM	Deliver ITOC to GSFC	B. Anselm	Incorporate any GLAS T&C Updates Submitted by 10/18 - BASD/Peiper	September 28, 1999	November 1, 1999	November 4, 1999	Closed	ITOC received
113	Sep99TIM	GLAS Hot Target	B. Anselm	Propose solutions to the GLAS T/V hot target problem.	September 28, 1999	October 15, 2000	April 4, 2000	Closed	Propose running shroud halves independently hot/cold in Ball facility.
114	Sep99TIM	Deadline to Provide BASD ITOC Page Updates Prior to Initial ITOC Delivery on 11/1 (if required)	E. Ketchum		September 28, 1999	October 18, 1999	October 18, 1999	Closed	Updates provided
115	Sep99TIM	GLAS Simulator	E. Ketchum	Deliver GLAS Simulator to BASD with Flight-Like and Flight-Length IRU, IST, and LRS Cabling; Grounding Straps for the IRU, IST, and LRS; and Flight-Like, but Not Flight-Length GLAS/MEU Cabling	September 28, 1999	April 30, 2000	May 2, 2000	Closed	Simulator delivered to Ball and checked out 5/2/2000.
116	Sep99TIM	Provide Interim Status Review on the GLAS Simulator the 2d Week in January	E. Ketchum		September 28, 1999	January 10, 2000	January 13, 2000	Closed	
117	Sep99TIM	BCE Mini Target	T. Feild	Propose solutions to the GLAS T/V hot target problem; Provide radiator FOV requirements or radiator hot sink needs or define size and proximity of each hot sink.	September 28, 1999	April 30, 2000	May 2, 2000	Closed	Hot targets and FOVs completely discussed at 5/2/00 TIM. Solutions have been proposed and detailed drawings are in-work.
118	Sep99TIM	GLAS Hot Target	S. Pandit	Define preliminary mini target dimensions and placement.	September 28, 1999	April 30, 2000	May 2, 2000	Closed	Preliminary mini target dimensions and placement provided at 5/2/2000 TIM.
119	Sep99TIM	GLAS T/V Feedthroughs	T. Feild	Define T/V bulkhead feedthrough requirements, including fiber optics	September 28, 1999	April 30, 2000	May 2, 2000	Closed	GLAS T/V bulkhead requirements discussed. Ball has offered half of the spacecraft plate for additional GLAS signals. This appears to be adequate for testing needs.
120	Sep99TIM	Magnetic Field Strength of Laser; Distance for a 10 mg Field; Prediction of Interference with Spacecraft Magnetometers	E. Ketchum	Analyze the magnetic field strength of the laser; determine the distance for a 10 mg field; predict any interference with the spacecraft magnetometers	September 28, 1999	June 30, 2000	March 13, 2000	Closed	Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).

121	Sep99TIM	Spacecraft Timing Among the GPS Time, VTCW, and Resets	M. Tasevoli	Document spacecraft timing among the GPS time, VTCW, and resets	September 28, 1999	January 15, 2000	February 10, 2000	Closed	Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002). Refer to Ball SER SYS086A.
122	Sep99TIM	GLAS Delivery	T. Feild	Review GLAS initial delivery and checkout timeline with BASD and Project.	September 28, 1999	April 30, 2000	May 2, 2000	Closed	Initial delivery and checkout tasks completely reviewed at 5/2/2000 TIM.
123	Sep99TIM	Level of I&T Detail to be Reported by BASD in the Monthly Schedule	D. Wood	Negotiate and agree on the level of I&T detail to be reported by BASD in the monthly schedule	September 28, 1999	October 16, 1999	October 26, 1999	Closed	New schedule received.
124	Sep99TIM	Acoustic Testing Done at Observatory (Baseline) or Spacecraft (Change) Level	D. Wood	Decide if acoustic test should be done at Observatory (baseline) or Spacecraft (change) level	September 28, 1999	January 18, 2000	January 31, 2000	Closed	Re-baselined I&T schedule to show acoustic at S/C level.
125		FSW Event Log	E. Chang	Ball/ICESat Project should look into the possibility of adding an 'event log' to record flight software events that occur while the spacecraft is not in contact with the ground. This is an essential element of mitigating risk for a Leo satellite that has minimal contact time and large time periods between contacts.	December 30, 1999	March 30, 2000	March 23, 2000	Closed	The mission operations team is satisfied that sufficient telemetry exists to monitor and analyze mission performance without the need for an on-board event log. The issue was resolved at the MOR.
126		Minimum Workmanship Random Vibration (RV)	D. Wood	Concern that the GEVS minimum workmanship RV levels will be enveloped by component test levels across all frequencies. This may not be a factor due to the high acoustic environment of Athena II.	December 30, 1999	March 23, 2000		Open	

127		Acoustic Test	D. Wood	1) Will Ball facility be able to achieve the 143.3 Db level required? QuikSCAT acoustic testing in this facility achieved a 133.7 Db level which is significantly less than ICESat requirement. Facility will have to demonstrate achieving the higher level prior to ICESat tests; 2) Test time duration for 143.3 Db level will have to be increased from 5 sec to allow sufficient time to obtain and process response vibration data; 3) Systems powered on for launch should be powered on for this test. Since the proposed method of acoustic testing at BASC is relatively new, it should be carefully examined to insure that unsafe levels can not be accidentally inflicted, including by plausible failures or human error.	December 30, 1999	March 23, 2000	May 15, 2000	Closed	1) Chamber changed to Lockheed Martin facility, which has 154 dB OASPL capability; 2) Test duration will allow sufficient data capture and processing; 3) Powered-off testing was agreed to in the baseline fixed-price proposal. Transporting and reconfiguring the GSE at Denver is not covered. There is no significant benefit from pre and post testing at Denver vs. Ball facility.
128		Radiated Emissions and Susceptibility	D. Wood	Launch mode radiated emission test should include S-band notch for launch vehicle. Radiated susceptibility should be notched for S-band and C-band, etc.	December 30, 1999	March 23, 2000	May 2, 2000	Closed	Plans are in place with Boeing and VAFB to identify appropriate notching. Testing will cover the correct spectrum.
129		I&T: Radiators in T/V	D. Wood	Applying heat only to SCC radiators does not provide correct thermal environment for rest of S/C and the distributed components (cannot balance S/C nor achieve qual/acceptance levels on external components). How are thermal 'targets' for GLAS provided, since cannot attach to GLAS radiators? Lots of thought must be used to provide correct environment to verify distortions and therefore mission success.	December 30, 1999	March 23, 2000	May 2, 2000	Closed	Ball thermal chamber shroud can be split in two halves. An additional plate consisting of two separately controlled halves will be suspended over the top (+Z) end of the Observatory to control the GLAS radiator environment. Four calorimeter probes will also be suspended to record the FOV temperature.

130		Solar Array Drive Life Testing	M. Tasevoli	Previous flight experience and pre-flight analysis for future missions for solar array drive probably did not have similar operations concept dependent on solar beta angle. Follow-on analysis should be considered modeling planned ICESat operations concept.	December 30, 1999	December 30, 1999	April 13, 2000	Closed	BASD had provided System Engineering Reports #EPS074 and EPS078, available on the BASD FTP. They document the solar array drive design and test concerns, and compare test article design and test parameters with the ICESat flight unit. The SERs were reviewed and approved by Code 500 (Rodger, Posey, Ryan).
131		Contamination	B. Anselm	When spacecraft is flying with thruster end in the velocity vector and thrusters are activated, won't the plume products enter the S/C star tracker? Affect GLAS instrumentation? The S/C will be operating for 1/4 year with a velocity vector (vel3), where the propulsion system will be 'loading' or on the 'forward' end of the spacecraft. This means that when you use the thrusters to maneuver, the plumes from the thrusters will be in 'front' or leading the vehicle. Under these conditions, will there be plume impingement on 1) GLAS instrument, 2) startrackers or 3) solar arrays?	December 30, 1999	December 30, 1999	February 4, 2000	Closed	Star Trackers moved to +Z end; Requirement added to exclude GLAS and ST optics from thruster cone expansion.

132		Inclination burns, early decision	J. Marius	During the science discussion, it was stated/implied that the science team would decide whether to perform the inclination burns necessary to get on the nominal inclination after launch. This was proposed in order to save fuel and extend the mission. Such a decision should be made before launch (we'll live with inclinations from X to Y...). Inclination burns will probably start within the first week or two after launch and the time to study the science impact of a different inclination will not be timely, so knowing beforehand what range of inclinations are acceptable would allow more rapid entry into science operations.	December 30, 1999	April 30, 2000	March 23, 2000	Closed	At the MOR, it was agreed that the ~X2 fuel capacity, plus the flight history of the Delta II, leaves enough margin that the existing tolerance on the orbit inclination is satisfactory.
133		Solar Reflectance	E. Ketchum	The impact of reflected solar energy off of water (and possibly ice) should be studied. Near the equator and during low beta angles, GLAS will see several minutes of reflected sun off the ocean. The intensity of the reflectance will be high (~1/3 sun) and the temperature of some of the instrument may get very high (a Ti part was mentioned). The impact to the detectors should also be assessed in some detail.	December 30, 1999	June 15, 2000	May 10, 2000	Closed	Flight Dynamics and the attitude control group in mission operations have incorporated the ability to permanently off-point the mission any fixed amount. The precise off-point will be devised 6 months prior to launch, and can be tweaked anytime during the mission.

134		Contamination	E. Wooldridge	ICESat contamination analysis should be updated to reflect new information on the materials used on ICESat and GLAS. We should take a close look at MLI material, lubes, thermal greases, etc. Also, are numbers affected by early turn-on of IRU and ST or flying in 'airplane' mode with GLAS behind the observatory? Sensitive optics on GLAS may preclude use of certain materials due to potential contamination effects. With no current PAML (or PAPL), potential exists for later exclusion of certain materials, specifically thermal materials on ICESat. GSFC (GLAS contamination) should rigorously review use of thermal grease (Apezion) et al. for this reason.	December 30, 1999	June 30, 2000		Open	
135		Power Balance During Delta-V Maneuver	B. Anselm	Recommend a power balance be performed for the case of executing a Delta-V maneuver and immediate return to science taking mode. Mid-beta angles, which have an eclipse, might be the worstcase.	December 30, 1999	March 30, 2000	September 22, 2000	Closed	Interim power balances have shown sufficient margin. Action Item 137 will completely address the issue.
136		Requirements Verification	R. Kolecki	Presenter indicated that performance verification philosophy for non-modified RS-2000 design would primarily be by "similarity". Verification by similarity in design should be used sparingly since other aspects such as workmanship could impact ability to meet system requirements or ICESat unique configurations (e.g., GLAS mount).	December 30, 1999	April 30, 2000		Open	

137		Battery Thermal Analysis	M. Tasevoli	Complete the following analyses for battery thermal design: 1) on the launch pad, solar arrays stowed, battery on trickle charge then transitioning to powering spacecraft; 2) during launch, solar panels stowed, maximum discharge rates and worst case loads and acquisition time; 3) on the ground, solar panels stowed, during battery reconditioning. Some of the thermal analyses may impact operations in order to keep battery within safe temperature limits; 4) perform analysis on battery margin in launch. Even with uncertainties with the launch vehicle and acquisition scenario, a worst case analysis can be done to show margin to max depth of discharge. This analysis can then be iterated as new information becomes available.	December 30, 1999	April 30, 2000		Open	
138		Verification of Requirements	D. Wood	It seems to make sense to verify the following requirements by 'TEST'. Only verified by 'DESIGN' in Vib: EP-4 (GLAS power feed), EP-8 (S/C-to-GLAS cabling), ELEC-4 (grounding).	December 30, 1999	March 23, 2000	June 21, 2000	Closed	The requirements cited will, indeed, be verified by test at the IPTO/Break-Out-Box testing, as reflected in the current test plan.
139		Propulsion Subsystem Pressure Test	D. Wood	Pressurize propulsion subsystem with blanket pressure (200 PSI, helium) prior to s/c vibration and tv test. Check for leakage after s/c testing.	December 30, 1999	March 23, 2000	June 9, 2000	Closed	Ball will pressurize the propellant tank with Nitrogen prior to vibration testing, for leak check.
140		Thermal Vac	D. Wood	Need to resolve how GLAS will be instrumented for temperature control during observatory thermal vac.	December 30, 1999	April 30, 2000	May 10, 2000	Closed	Ball has identified thermocouple and heater allocations for the GLAS instrument. Detailed placement is being worked with the thermal engineers.

141		Thruster Firing During Detumble State	M. Tasevoli	When are the catbed heaters turned on in the mission timeline? Issue is that catbeds require a minimum period for power-on before thruster firings. Otherwise, a cold firing could limit lifetime.	December 30, 1999	December 30, 1999	April 20, 2000	Closed	BASD supplied System Engineering Reports ACS 064 and 065 which document Safe Mode and Emergency Mode triggers/responses and anomalous thruster activation fault scenarios. ICESat uses wheels instead of thrusters during safe modes in a closed loop fashion, and uses thrusters in an open loop sequence via non-computer hardware control. The implementation was reviewed and accepted at the March 00 ACS TIM and peer reviews.
142		GLAS Heater Power in Acquire Sun	R. Stone	During the moments after reaching acquire sun, the GLAS thermal system has an increased budget of 150w versus 50w budget in emergency mode. Sizing heaters to maintain required temperatures in acquire sun would result in consuming more than 50w in emergency mode due to the passive thermal control heater circuits. This is because the 50w in emergency mode and 150w in acquire sun currently are allocated through the same relay on the essential bus. It makes sense to evaluate the power distribution system's ability to separately relay the 100w to achieve thermal requirements in acquire sun while using only 50w in emergency mode. Additional relays on this safe mode bus could be added for additional 100w.	December 30, 1999	June 30, 1999		Open	Heater locations have been identified for GLAS, allowing a task to be issued to Swales to analyze their predicted power consumption for all orbit modes. Results expected by July 30, 2000.

143	ST-IWG	Adequacy of Messages With Regard to Operating the IST	M. Sirota	Review Table 1 in the Ball SRS ICD for adequacy of the messages with regard to safely operating the IST (i.e. commands to add to the spacecraft database, telemetry, etc.)	January 18, 2000	January 21, 2000	January 21, 2000	Closed	Email to Ball.
144	ST-IWG	Health and Safety Telemetry Words	A. Squillante	Identify a subset of the existing health and safety telemetry words, and their nominal values/ranges, for the spacecraft to parse from the current baseline frame for use onboard the spacecraft for overall H&S monitoring.	January 18, 2000	January 21, 2000	January 27, 2000	Closed	Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
145	ST-IWG	Distribute IST and LRS ICDs	A. Squillante	Provide a copy of the latest Raytheon IST and LRS ICDs to the GLAS team.	January 18, 2000	January 17, 2000	January 17, 2000	Closed	
146	ST-IWG	Sanitization of updated Raytheon IST and LRS ICDs	M. Sirota	Sanitize the updated Raytheon IST and LRS ICDs, in accordance with the previous rules, for release to Ball.	January 18, 2000	January 21, 2000	January 21, 2000	Closed	
147	ST-IWG	Review Physical ICD for Issues to be Addressed in Spacecraft ICD	M. Sirota	Review the latest Raytheon Physical ICD for issues that need to be addressed in the spacecraft ICD (e.g. hazardous TEC commands).	January 18, 2000	March 30, 2000	May 5, 2000	Closed	All hazardous commands identified for the review board that baselined the SRS ICD.
148	ST-IWG	IST Prototype as the LRS Prototype	A. Squillante	Determine if, and how, the IST Prototype unit can also serve as the LRS Prototype.	January 18, 2000	March 15, 2000	March 30, 2000	Closed	Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
149	ST-IWG	Interface Characteristics in IST and LRS Prototypes	P. Lyman	Generate a list of interface characteristics desirable in IST and LRS Prototypes for testing the interface with the spacecraft.	January 18, 2000	February 28, 2000	March 16, 2000	Closed	Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
150	ST-IWG	Timing Diagram for 1553 Interface Data Flow	P. Lyman	Add a timing diagram for the -1553 interface data flow to the SRS ICD.	January 18, 2000	March 3, 2000	March 2, 2000	Closed	Timing diagram added to latest ICD revision.

151	May00TIM	On-Site Support for Four-Day Test	B. Anselm	Arrange on-site support from Raytheon and Litton for the four-day test in August.	May 3, 2000	May 19, 2000	September 22, 2000	Closed	Raytheon and Litton support was provided for all the September testing.
152	May00TIM	Identification of Storage/Space, Power, and Voltage Requirements	T. Feild	For each BCE/GSE rack, identify preliminary floor space, power and voltage. Include the "BCE Power Racks" and the Major Target. State internet access and office space requirements; estimate total storage requirements; identify all MGSE to be shipped to Ball for contingency support (don't plan to use it).	May 3, 2000	May 19, 2000		Open	
153	May00TIM	Crane/Hydraset Operation at Ball	B. Maxwell	Provide the SOP for crane and hydraset operation at Ball; state Ball policy on non-Ball operators.	May 3, 2000	May 19, 2000	June 9, 2000	Closed	The Ball policy on non-Ball crane operators is explicit: Only Ball employees shall operate lifting equipment on Ball property. There is no need for the SOP.
154	May00TIM	Provide Drawing of Facilities for Instrument Area Around Brutus	B. Maxwell	Provide a drawing of the facilities and floor space, personnel access, power, and constraints, for the Instrument area around Brutus.	May 3, 2000	May 19, 2000	May 9, 2000	Closed	Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002) and drawing which was supplied is in Visio 5.0 format.
155	May00TIM	High Speed Data Capture Formats	B. Maxwell	Identify the High Speed Data Capture formats.	May 3, 2000	May 19, 2000		Open	
156	May00TIM	Drawing of +Z Heater Plate Geometry	E. Grob	Provide a dimensioned drawing of the (S/C) +Z heater plate geometry showing zones, FOV, and control requirements for Ball to review and comment.	May 3, 2000	May 19, 2000		Open	
157	May00TIM	Rationale for Performing T/V Before T/B	E. Kelly	Provide Ball's rationale for performing T/V before T/B.	May 3, 2000	May 19, 2000	May 10, 2000	Closed	Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
158	May00TIM	Demonstrate How Base Flatness Will Be Determined and Maintained in T/V	B. Maxwell	Show how the 0.1 inch over 48 inch base flatness will be determined and maintained in T/V.	May 3, 2000	May 19, 2000		Open	
159	May00TIM	Simulation of Four ICESat Yaw Conditions During T/B	E. Kelly	Show to what degree the four ICESat yaw conditions will be simulated during T/B.	May 3, 2000	May 19, 2000	May 10, 2000	Closed	Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).

160	May00TIM	T/V Feedthroughs	T. Feild	Provide a list of all T/V feedthroughs (signal, optical, GSE, etc.).	May 3, 2000	May 12, 2000		Open	
161	May00TIM	Provide for GSFC Training	B. Anselm	Provide syllabus, handbook, tests, handouts, etc. for GSFC training.	May 3, 2000	May 19, 2000	June 9, 2000	Closed	There is no need for the training material because all GLAS team members will be trained and certified by BASD prior to their working in sensitive, restricted areas.
162	May00TIM	GLAS Purge Port Panel/Chiller Connection Locations	E. Ketchum	Provide a drawing showing the GLAS purge port panel and chiller connection locations.	May 3, 2000	July 5, 2000		Open	
163	May00TIM	Red/Green Item List	T. Feild	Provide a draft tag board list of Red/Green items.	May 3, 2000	May 19, 2000	May 10, 2000	Closed	Closure Documentation on file in CMO (Refer to CMO Document Number: ICES-401-MISC-002).
164	May00TIM	GLAS Environmental Qual Limits	T. Feild	Provide the GLAS environmental Qual limits for Ball to ensure they are nested in the Observatory limits.	May 3, 2000	May 19, 2000		Open	
165	May00TIM	Minimum Purge Flow Rate During Transportation	T. Feild	Define the minimum purge flow rate during transportation for Ball to design venting and avoiding over pressure.	May 3, 2000	May 19, 2000		Open	
166	May00TIM	CM Used for Simulator Hardware/Software Control	J. Shafer	Identify the configuration management used to control the Simulator hardware and software.	May 3, 2000	May 19, 2000	September 8, 2000	Closed	The Configuration Management used to control the Simulator hardware and software has never been implemented. We have all the necessary paper work its just a matter of getting into CM.
167	May00TIM	Simulator Interface with ITOC Before Delivery	J. Shafer	Assure that the refurbished Simulator interfaces with the ITOC before delivery.	May 3, 2000	July 20, 2000	September 8, 2000	Closed	The GLAS Simulator could not be interfaced with the ITOC System to System for the following reasons: 1. The ITOC did not have the correct Spacecraft Interface Connectors. 2. The ITOC only supported 16 TYPE A Thermistors, GLAS Simulator has 18 Type A & 2 Type B 3. The ITOC had not been modifyed on the RS422 Data Science Inteface with the invertors. We did however do some independent

168	May00TIM	Revise GLAS T&C and Provide to Ball	E. Ketchum	The detailed GLAS telemetry and commands will be revised by the GLAS team and provided in Excel Spreadsheet to Ball for inclusion in the T&C Handbook.	May 3, 2000	January 5, 2001		Open	